

WATER QUALITY OF ROSEBUD COUNTY

Ground Water

A total of two ground water samples were collected from one well in Rosebud County as part of the MDA 2005 Yellowstone Characterization Project. The well sampled was shallow (29 feet) and was located down gradient of irrigated cropland areas (see attached map for location). No pesticides or nitrate were detected in the ground water samples collected in Rosebud County.

Some public water supplies are required to periodically test their water for various constituents including pesticides and nitrate. A search of public water supply entities in Rosebud County did not reveal any public water supplies that are obtaining water from shallow ground water in alluvial aquifers along the Yellowstone River and none of the public water supplies in the county had tested for pesticides since 2000.

Surface Water

Between 1999 and September 2004 the USGS collected 65 samples from the Yellowstone River near Forsyth and analyzed them for pesticides. The most commonly detected pesticides were atrazine, triallate, metolachlor, prometon, and cyanazine. All these pesticides, with the exception of prometon, are commonly used herbicides in corn, sugar beets, and small grain crops. Prometon, which is a nonselective herbicide used in non-agricultural settings, is more commonly used and detected in urban areas (Barbash and Resek, 1996). All of the pesticide concentrations were low and none of the concentrations exceeded any human health standards or aquatic life standards where such standards exist. It is important to note that many of the herbicides used for noxious weed control (2,4-D, picloram, and imazapyr, to name a few) were not analyzed for during the USGS monitoring effort, so the impacts of these control measures on the Yellowstone River remain unclear.

Between 1999 and September 2004 the USGS collected 74 samples from the Yellowstone River near Forsyth and analyzed them for nitrate. Nitrate was detected in 72 of the 74 samples at concentrations ranging from 0.03 – 0.65 mg/L with a median concentration of 0.2 mg/L. Nitrate concentrations showed a seasonal variation with higher concentrations occurring between October and March and lower concentrations occurring during the April to September time frame (Miller et al, 2004). These seasonal variations are believed to be due to a lack of algal activity which consumes nitrate during the winter as well as decreased dilution due to low stream flows during the winter.

Summary of Pesticide*/Nitrate Detections in the Yellowstone River near Forsyth from 1999 through September 2004 Collected by the U.S. Geological Survey

Pesticide Compound	Number of Samples Collected	Number of Samples with Pesticide Detected	Percent of Samples with Pesticide Detected	Minimum Concentration (µg/L)	Maximum Concentration (µg/L)	Drinking Water Standard (µg/L)	Aquatic Life Standard (µg/L)
Atrazine	65	51	78.5	E 0.003	0.328	3	1.80
Benfluralin	65	1	1.5	--	E 0.003	--	--
Carbaryl	65	1	1.5	--	0.005	700	0.20
Carbofuran	65	1	1.5	--	E 0.034	40	1.80
Chlorpyrifos	65	1	1.5	--	E 0.002	20	0.041
Cyanazine	65	10	15.4	E 0.003	0.018	1	2.0
EPTC	65	7	10.8	E 0.001	0.16	--	--
Malathion	65	1	1.5	--	E 0.004	100	0.10
Metolachlor	65	29	44.6	E 0.002	0.034	100	7.80
Prometon	65	19	29.2	M	E 0.01	100	--
Propargite	65	1	1.5	--	0.41	--	--
Simazine	65	1	1.5	--	E 0.003	4	10
Tebuthiuron	65	2	3.1	M	E 0.01	500	1.60
Triallate	65	33	50.8	E 0.001	0.012	--	0.24
Trifluralin	65	1	1.5	--	E 0.002	5	0.20
Nutrient Compound	Number of Samples Collected	Number of Samples with Nitrate Detected	Percent of Samples with Nitrate Detected	Minimum Concentration (mg/L)	Maximum Concentration (mg/L)	Drinking Water Standard (mg/L)	Aquatic Life Standard (mg/L)
Nitrate + Nitrite	74	72	97.3	0.03 E	0.65	10	--
E = Estimated value M = Presence of chemical verified but not quantified							
* This table only contains a summary of pesticides detected; many other pesticides were analyzed for and not detected							

Barbash, J.E., and Resek, E.A., 1996, Pesticides in ground water – Distribution, Trends, and Governing Factors: Chelsea, Michigan, Ann Arbor Press, Pesticides in the Hydrologic System series, v. 2, 588 p.

Miller, K.A., Clark, M.L., and Wright, P.R., 2004, Water Quality Assessment of the Yellowstone River Basin, Montana and Wyoming – Water Quality of Fixed Sites, 1999-2001, U.S. Geological Survey Scientific Investigation Report 2004-5113.

Smith, L.N., LaFave, J.I., Patton, T.W., Rose, J.C., and McKenna, D.P., 2000, Ground-Water Resources of the Lower Yellowstone River Area: Dawson, Fallon, Prairie, Richland, and Wibaux Counties, Montana. Montana Bureau of Mines and Geology Montana Ground-Water Assessment Atlas No. 1.